

## **EECEVAC03 - ELECTRICAL SAFETY**

### **COURSE OBJECTIVES**

- To impart knowledge about safety requirements
- To provide guidance on prevention of electrical shocks
- To study about various first aid methods
- To create awareness about various Hazardous areas
- To familiarize with safety management

### **UNIT I: INTRODUCTION**

General Background - Objectives of safety and security measures - Hazards associated with electric current and voltage - principles of electrical safety - Approaches to Prevent Accidents - Fundamentals of fire, initiation of fire, types - Fire Prevention and Fire Fighting - Objectives and scope of IE act and IE rules-General requirements for electrical safety as per IE rules - Do's and Don'ts for safety in the use of electrical appliances.

### **UNIT II: ELECTRICAL SHOCKS AND THEIR PREVENTION**

Primary and Secondary Electric Shocks - Occurrence of Electric Shock - Shocks Due to Flashovers/Spark-overs - Lightning Strokes on Overhead Transmission Lines and Outdoor Substations - Safety Precautions in Small LV Installations, Residential Buildings, Shops -Safety Procedures in Electrical Plant Installation and description of Earthing System - Equipment Earthing - Substation Earthing.

### **UNIT III: FIRST AID**

Introduction - Removal of Contact with Live Conductor- First Principles of Actions after Electric Shock - Artificial Respiration - Schafer's Prone Pressure Method - Silvester's Method - Nielson's Arm-lift Back - pressure Method - Mouth to Mouth Method - Use of Artificial Resuscitator - External Cardiac Massage - Cardiac Pulmonary Resuscitation - First aid treatment of Heat Exhaustion and heat stroke.

### **UNIT IV: ELECTRICAL SAFETY IN HAZARDOUS AREAS**

Introduction - Classification of Hazardous zones - Causes of sparks and flashovers in electrical plants and machines - Functional requirements of electrical equipment and installations for hazardous area/zones - Classification of equipment/enclosure for hazardous locations.

### **UNIT V: FIRE EXTINGUISHER AND ELECTRICAL SAFETY MANAGEMENT**

Fire Extinguisher - Extinguishing techniques - Prevention of fire - Types of fire extinguishers - Fire detection and alarm system - CO<sub>2</sub> and Halogen schemes - Foam schemes. Principles of safety management - Management's

safety policy - Safety organization - Organization charts for construction phase of a project, maintenance mode of a plant and for safety department - Safety auditing.

### **TEXT BOOKS**

1. S. Rao and H.L. Saluja, "Electrical Safety, Fire Safety and Safety Management", Khanna Publishers, 2012.
2. W.F.Cooper, "Electrical Safety Engineering", Butterworth and Company, London, 1998.

### **REFERENCES**

1. J. Cadick, D. Neitzel and A. Winfield, "Electrical Safety Handbook", McGraw Hill Education, 2012.
2. J. Maxwell Adams, "Electrical Safety-A Guide to the Causes and Prevention of Electric Hazards", The Institution of Electric Engineers, 3<sup>rd</sup>Reprint, 2009.
3. Martha J. Boss and Gayle Nicoll, "Electrical Safety - Systems, Sustainability and Stewardship", CRC Press, 2015.